# INTRODUCTION

Approximately 100 commercial sawmills and secondary manufacturing firms operate in the State of Alaska. Most of these mills produce primary wood products including cants, flitches, dimension lumber, shop lumber, railway ties, shakes and shingles, components for musical instruments, and a variety of specialty products. A limited number of firms produce secondary wood products such as millwork, furniture, and prefabricated buildings. To some degree, Alaska firms have differentiated themselves from other producers by manufacturing products from high-quality old growth western hemlock, Sitka spruce, Alaska (yellow) cedar, and western red cedar (Alaska Division of Trade and Development 1999).

While Alaska producers appear to be able to command a high price for high quality logs, several factors have severely limited the competitiveness of Alaska's timber industry. First, Southeast Alaska's only pulp mills closed in 1993 and 1997. Second, there are several factors related to Alaska's infrastructure and unique location, including higher costs for transporting goods out of the state and higher manufacturing costs due to low economy of scale. Third, the Tongass Land Use Management Plan (TLMP), adopted in 1997 and revised with further reductions in April 1999, significantly limited harvest volumes in federal forests. Finally, the Asian economic crisis caused a substantial decline in the demand for forest products in Asian countries, previously Alaska's primary export market (Alaska Division of Trade and Development 1999).

Alaska firms have clearly been dependent upon exporting primary wood products, deriving over $660 million in revenue in 1993, the industry's peak. However, by 1998, export revenue had dropped below $200 million. This sharp decline is due to a variety of factors including the Asian economic crisis, declining international timber prices, lower cost competitors, changes in forest harvest regulations that led to a decline in Alaska's timber harvest, rising domestic processing costs, and expensive and time consuming shipping to export markets.

Alaska producers must confront several challenges in order to survive and expand their role as a competitor in the international timber market. The first challenge involves establishing a consistent raw material supply. The second challenge lies in the ability of Alaska producers to remain competitive with other low cost producers in supplying Pacific Rim markets. Logistical issues such as a limited infrastructure to transport raw materials within the state and to foreign markets, inadequate economies of scale, and high production costs, have an adverse impact on the competitiveness of Alaska's forest products exports. This report will analyze the competitive issues confronting Alaska's forest products industry, analyze specific market segments that may be of interest to the forest products industry, and evaluate Alaska's competitive position in these markets.

# THE ALASKA FOREST RESOURCE

### Alaska's Commercial Species

There are two distinct forest types in Alaska: coastal and interior. The interior forest covers 115 million and is comprised of 61% softwood and 39% hardwood species (Table 1). Alaska's interior forests contain approximately 23% of Alaska's total timber inventory, 34 billion board feet of which is hardwood species, mainly brush alder, birch, aspen, and cottonwood. Greater volumes of white spruce logs were harvested from the interior forests during the 1980s and 1990s when demand and prices were high. However, since overall demand for timber in Asia has waned following the 1997 economic crisis, demand for white spruce from the interior forests also declined. Overall, since the interior forest resource is dispersed over a large area, it is less important as a commercial timber resource than the forest area in Southeast Alaska. The coastal forest, located primarily in Southeast Alaska, covers just 14 million acres but contains 77% of Alaska's timber inventory, making it the dominant source of supply for the state's timber industry. This area has been the primary source of timber for Alaska's forest industry, including solid wood and the state's now defunct pulp mills. The coastal forest is predominately comprised of softwood species (99%), with minor amounts of hardwoods.

Sitka spruce (*Picea sitchensis*) and western hemlock (*Tsuga heterophylla)* are the dominant timber species in Alaska, representing 26% and 34% of the statewide timber inventory, respectively. Western red cedar (*Thuja plicata*) and yellow cedar (*Chamaecyparis nootkatensis)* have high market values but low stumpage volumes (1% of total inventory), preventing them from being major commercial species.

**Table 1.** Alaska's forest inventory by region and forest type.

| | Softwood (MMBF) | Softwood Percentage | Hardwood (MMBF) | Hardwood Percentage | Regional Total | Regional Precentage |
|---|---|---|---|---|---|---|
| **Coastal Region** | 287,422 | 99% | 3,580 | 1% | 291,002 | 77% |
| **Interior Region** | 53,344 | 61% | 34,048 | 39% | 87,392 | 23% |
| **Total (AK)** | **340,766** | **90%** | **37,628** | **10%** | **378,394** | **100%** |

Source: van Hees 1999.

Alaska is the world's leading supplier of Sitka spruce lumber, exporting 215 million board feet annually (Warren 1997). However, British Columbia (BC) and the US Pacific Northwest (PNW) are also within the growing range of most Alaska specie. This places Alaska forest products in direct competition with BC and the PNW in commodity markets.

**Forest Ownership Patterns in Alaska**

Forest ownership in Alaska can be divided into four categories: federal, state owned forests (including boroughs and municipalities), state owned lands for "general-use" or forestry, and private (including native corporations). Approximately 77 million acres are federally owned, 22 million acres are owned by the state, and 30 million acres are privately owned. A variety of factors, however (including set-asides, harvest regulations, and poor accessibility), severely limit the forest area that is designated as commercial. There have also been significant reductions in available timber harvest volume due to the declining quality of the standing timber, stand density as well as issues related to accessibility and politics. Out of 77 million acres of federal forests, just 576,000 acres are available for commercial activities. Similarly, in Southeast Alaska just 66,800 acres and 522,090 acres of state and private forests, respectively, are regarded as commercial forests.

The various forest ownerships are subject to different harvest restrictions, which influences timber use and the resulting mix of wood products. Although the Alaska Division of Forestry cannot outright ban the export of logs from state owned forests, it is the policy of the administration to focus on sales for Alaska mills (Johnson 2000). Federal timber harvest regulations restrict the export of logs harvested from federal forests. Private forest owners, who are exempt from this restriction, concentrate on exporting high value logs. As a result, the wood used by secondary processors is largely limited to timber harvested from state and federal forests.

*Federal Timberland*

The Tongass National Forest (Tongass), located in Southeast Alaska, contains 46% of the state's timberland, and represents the largest single forest ownership in the state. The Tongass consists of 16.9 million acres, of which 676,000 acres (4% of the land) have been made available for commercial harvest. The Tongass has been a major supplier of timber to local sawmills and, as a result, the forest products industry in Alaska is primarily concentrated in Southeast Alaska.

Recent changes to the Tongass Land Management Plan (TLMP) have severely reduced the volume of timber available for harvest. Four regulatory changes threaten to severely reduce the availability and access to the forest resource. First, one of the most important changes to the plan was a change enacted in 1999 to remove 100,000 acres from the harvestable timber base, reducing it to 576,000 acres. Second, the allowable harvest rotation age was doubled to 200 years, making it harder to develop an industry based on second growth timber. Third, open road density in the forest was reduced from 1 mile to 0.7 miles per square mile of forested land, compounding access issues already inherent in the forest. Finally, average allowable sale quantity (ASQ) was cut from 267 million board feet to 187 million board feet, placing an overall limit on the annual production of the forest (Golnick 1999).

The species mixture on the Tongass includes 51% #2 and better grade Sitka spruce, hemlock, and western red cedar, 42% # 3 and utility grade, and 2% cedar (Figure 1). The loss of the pulp mills means that the low-grade material must find another outlet. Utilizing or disposing of this timber efficiently will be important to the future competitiveness of the industry (Morse 1998). The second largest federally owned forest is the Chugach National

Forest on the Kenai Peninsula, which encompasses Prince William Sound and much of the surrounding area. Although it is the second largest National Forest with 5.3 million acres, it supplied just 0.3% of Alaska's total harvest in 1997.

*State Timberland*

The State of Alaska has 24.9 million acres of forestland. Of this total, 4.3 million acres are considered commercial forests and are capable of growing 20 cubic feet per acre per year. These figures include both state public domain land, which is available for multiple use including forest management, and designated state forest lands. The two designated state forests contain just over 2 million acres of the state's forested lands. The 247,000 acre Haines State Forest, established by the legislature in 1982, covers the Chilkoot, Chilkat, and Ferebee drainages in the northern portion of Southeast Alaska. The 1.8 million acre Tanana Valley State Forest that stretches from Manley to Tok in Interior Alaska was created one year later (DCED 2000).

Approximately 2% of state forests in the Haines State Forest and the Tanana Valley State Forest are considered harvestable (Alaska DNR 1998). Within these two forests 66,800 acres are considered suitable for commercial harvesting (Alaska Department of Forestry 1995; The Southeast Regional Timber Industry Task Force 1997). The inventory of standing timber in state forests (Haines and Tanana Valley) is approximately 3.4 billion board feet, and approximately 57 million board feet is available annually for harvest. State forests, which are under multiple use management plans, must allow timber harvest for commercial and private use. Timber harvests over the past five years have totaled 11 million board feet in the Haines State Forest and 35 million board feet in the Tanana State Forest (Phelps 1997). These harvest figures are governed by constitutional sustained yield considerations, the state public land planning process, and budgetary concerns. Some relatively large salvage sales in the past few years have temporarily elevated annual sale totals. Sales are offered to prospective buyers by competitive bid, negotiated contract and personal use. With its extensive use of negotiated sales, the sale program emphasizes sales for local, value-added wood processing and most timber from state land is processed in state (DCED 2000).

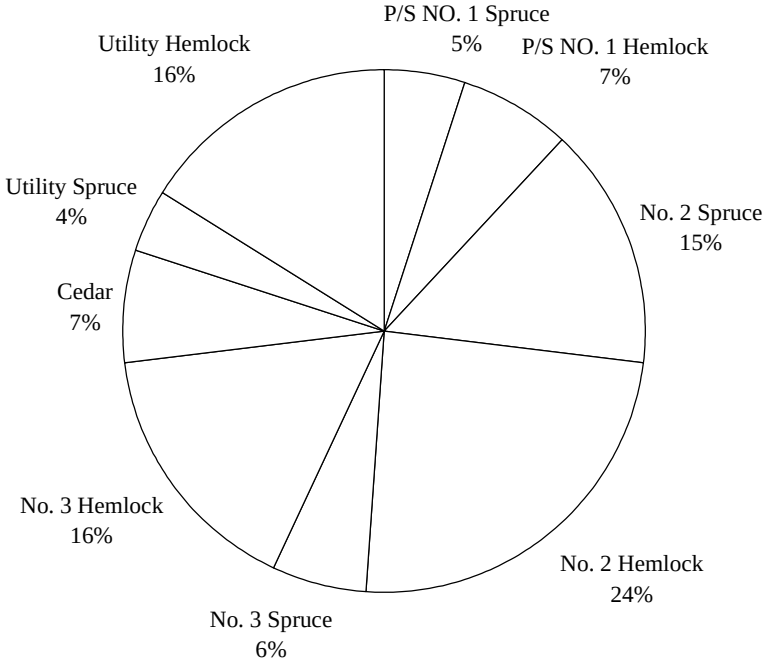



**Figure 1.** Inventory results of the log grades in the Tongass National Forest
(Source: The Southeast Regional Timber Industry Task Force 1997).

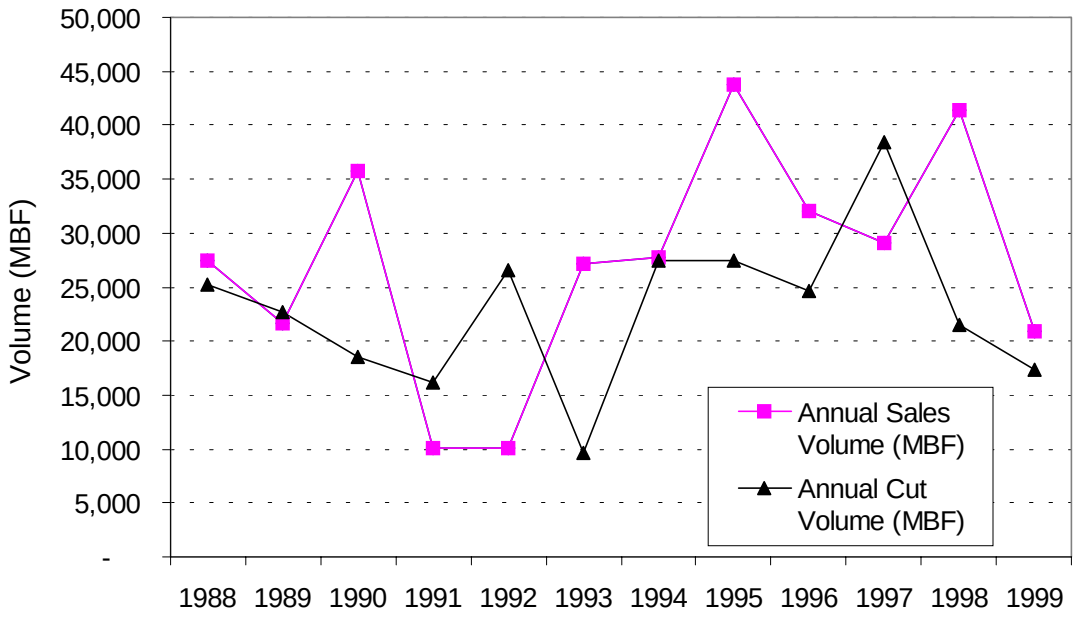



**Figure 2.** Annual timber sales and harvest volume for state lands (State Forests and Lands for General Use), 1988-1999 (Source: Alaska Department of Natural Resources, Division of Forestry, unpublished data).

Figure 2 illustrates annual timber sales and harvest levels on total state lands. These volumes have varied widely the 12 year period shown, yet recent sales harvest volumes are almost equal to levels in 1988. Variation is due to a variety of factors such as a decline or increase in the volume of salvage harvests. State, private, and municipal forests are subject to the Forest Resources and Practices Act (FRPA). The Act, which requires that harvested forest land "be reforested to the fullest extent practicable", is intended to protect the forest, water quality, and fish habitat. Provisions for harvesting on state and municipal forests mandate that landowners must have data showing that reforestation activities will lead to the sustainable production of forest products (Alaska DNR 1998b). Alaska management practices usually rely on natural regeneration and in Southeast Alaska natural regeneration following harvest activities is generally prolific. This prolific regeneration often leads to overstocking of second growth stands and contributes to problems associated with stand stagnation, small diameter timber, and poor timber quality. Federal forests are not covered by the FRPA, but the management standards on federal land either meet or exceed the FRPA standards.

The Alaska Department of Natural Resources, Division of Forestry (DOF) has leeway in making small sales to meet the needs of local processors. For example, the DOF can authorize timber sales of up to 500,000 board feet on state lands. If unemployment is high and mill capacity grossly underutilized, the DOF can make larger sales for terms up to 25 years. Timber sales of up to 10 million board feet can be negotiated provided the timber is used in local value-added manufacturing operations (Phelps 1997). From fiscal year 1997 to fiscal year 1999, the DOF has offered an average of 75 sales per year, averaging 42 million board feet of timber annually, a program that has been well received by local logging contractors and forest products companies (Alaska DNR 1998c). The authority of the state to make timber sales under these conditions can help nurture the secondary wood processing industry. However, regulations may also restrict the development of the processing industry by raising log prices.

*Private Timberland*

Alaska's commercially viable private forests comprise 30 million acres and are concentrated in the Southeast and Southcentral regions of the state. Native Corporations own 98% of the region's private forestland (Alaska DNR 1998). Regulations governing private forestland tend to be less restrictive than the regulations applied on federal forests. While the Forest Practices Act does apply to private lands, it has been noted that it is only loosely enforced with a focus on protecting the spawning beds of anadromous fish (USDA Forest Service 1999). Access to much of

the private forestland is limited by an inadequate road infrastructure and the physical characteristics of the terrain that significantly increase the cost of timber extraction. Of the 550,000 acres of private timberland in Southeast Alaska, only about 391,000 acres are considered commercial and available for harvest (The Southeast Regional Timber Industry Task Force 1997).

Timberland ownership patterns and government harvest regulations have several impacts on the industry. The ban on log exports from federal forests reduces the stumpage value of federal timber. The residual stumpage or timber value (market price less processing cost) of processed lumber in Alaska is generally lower than that of export logs, and is reflected in the lower stumpage price of federal timber which cannot be exported. The lucrative export market for logs attracts almost all of the high-quality logs harvested from private forests. Producing cants for the export market is often the most profitable operation for a sawmill that relies on federal timber. This strategy circumvents the log export ban while requiring only minimal processing. Cants are often shipped to Japan where they are re-sawn.

Primary and secondary processing operations are severely impacted by the log export ban. Since virtually all logs from private forests are exported, local sawmills are almost completely dependent upon federal timber for their raw materials. These sawmills cannot compete with the export market for private logs and are confronted with declining harvest volumes from state and federal forests. Without an adequate and reliable supply of raw material, establishing a primary or secondary wood processing industry of an economic scale will be problematic.

**Timber Harvest Trends in Alaska**

Annual harvest volumes in Alaska have been declining over the past several years, dropping to 740 million board feet in 1997, a 30% decline from 1990. This decline can be primarily attributed to declining timber harvests in the National Forests. Alaska's National Forests, particularly the Tongass, supplied 46%, or almost 409 million board feet of Alaska's timber in 1990. However, timber harvest restrictions and regulations have reduced federal harvest levels to 125 million board feet in 1997, 69% below 1990 levels. While timber harvest volumes in private forests have been fairly stable since 1990, their share of the total timber harvest has increased from 53% in 1990 to 81% in 1997 (Warren 1999). Alaska forest products companies tend to rely on high value old-growth Sitka spruce and hemlock to increase their competitiveness relative to other suppliers. Table 2 shows the distribution of the species and log grades harvested in 1995. The bulk of the Sitka spruce harvest was premium and sawlog grade logs that captured premiums in the Japanese market.

**Factors Restricting Timber Harvest in Alaska**

There are several federal regulations that constitute the basis for managing federal forests and establish the pattern for state regulations, including: the National Environmental Policy Act, the National Forest Management Act, the Sustained Yield Act, and the Endangered Species Act (Alaska DNR 1998). In addition, legal challenges to proposed state and federal timber sales further call into question the ability of these forests to support an internationally competitive timber processing industry.

The reduced allowable sale quantity (ASQ) and high access costs could substantially restrict Alaska's ability to become a prominent value-added wood product manufacturer and supplier in the international market. International customers place a high value on stable supplier relationships throughout fluctuating business cycles. The trend towards declining harvest levels, increasingly restrictive harvest regulations, and court challenges to many public timber sales have raised questions as to the ability of Alaska to provide a reliable supply of forest products in the future.

**Table 2.** Distribution of 1995 harvest by species and grade for Southeast Alaska.

| | Premium Sawlog | Sawlog | Low-Grade Sawlog | Utility Grade | Species Share of Total |
|---|---|---|---|---|---|
| Sitka spruce | 17.4% | 52.7% | 11.3% | 18.6% | 23.8% |
| Hemlock | 7.2% | 41.2% | 24.8% | 26.8% | 58.3% |

Source*:* Robertson and Brooks, *unpublished report*. Region 10 Log Scale Ticket database, and COFI Vancouver Log Market reports.
*Note*: SEA log classes are translated as follows: Premium Sawlog = No. 1 sawlog, select and special mill. Sawlog = No. 2 sawlog. Low-Grade Sawlog = No. 3 and No. 4 sawlogs. Utility = utility.

**Future Harvest Trends in Alaska**

The sawmill industry is adjusting to increased timber harvest restrictions in the Tongass National Forest, and the future viability of the forest products industry depends to a large degree on a reliable and predictable supply of timber from public forests. While timber harvests from the Tongass are necessary to supply a competitive forest products industry in Alaska, this alone is not sufficient to provide a competitive forest products industry. While other factors can affect industry competitiveness (including processing efficiency, labor costs, and an adequate transportation infrastructure) and are equally as important as a reliable timber supply, this section will focus solely on a discussion of the projected timber supply based on two models that incorporate supply and demand scenarios. Despite the inherent uncertainty associated with timber supply projections, these models provide a framework for understanding the role that timber supply will have on the forest products industry in Alaska.

A model developed by Brooks and Haynes (1997) estimates future timber harvest volumes based on market demand. By varying the demand conditions and analyzing the impact on the processing industry, high, medium, and low demand scenarios for timber harvests were produced (Figure 2). Under the medium demand scenario model, the projections indicate that total harvest levels will continue to decline and stabilize after the year 2000. Based on the medium demand scenario, harvest levels on Alaska's National Forests are projected to gradually increase through 2010 while the reduction in the overall timber harvest can be attributed to the declining harvest on private lands. Projections estimate that production on private lands will fall below the harvest level on National Forests between 2000 and 2005 due to the declining timber inventory (Brooks and Haynes 1997).

A second model, incorporating high, medium, and low demand projections, was developed specifically for the Tongass National Forest (Morse 1998). The high demand scenario is based on the assumption that an efficient and competitive industry will be able to utilize most of the timber harvest. In the low demand scenario, market share will continue to decline as international competition and demand increase, and mills may utilize only the small but high valued segment of the resource (Figure 3). The medium demand scenario is closer to the low demand scenario. While market share and lumber recovery increase, producers are relegated to niche markets for old growth products, limiting overall growth and potential.

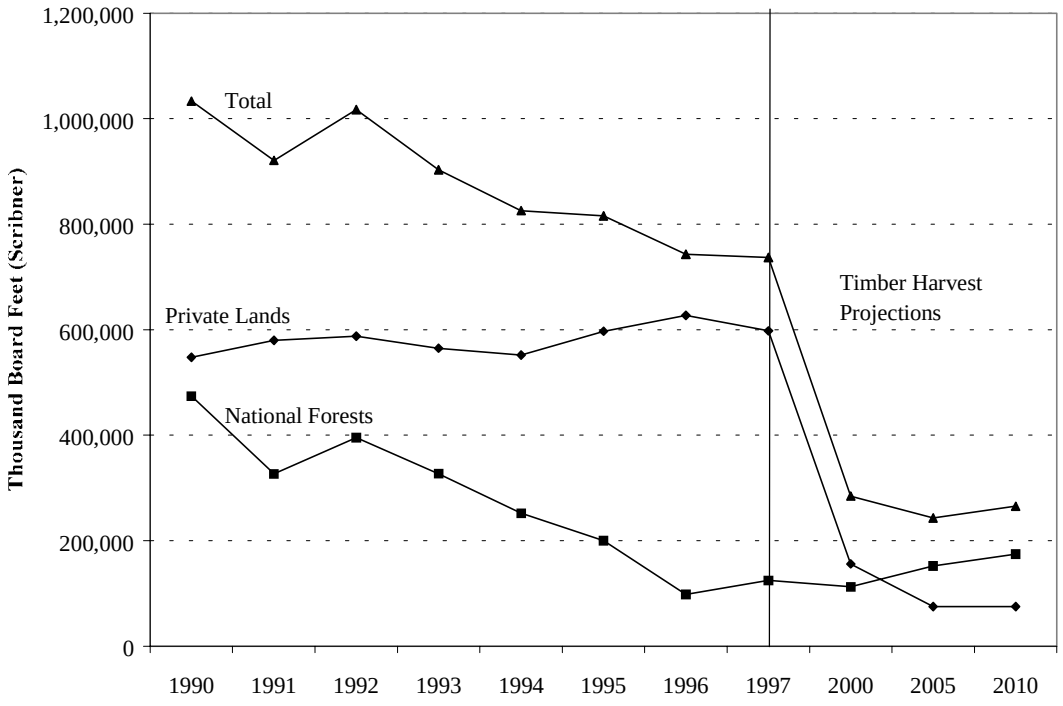



**Figure 2.** Alaska timber harvest volumes and projections by ownership under the medium demand scenario, 1990-2010 (Source: Brooks and Haynes 1997).

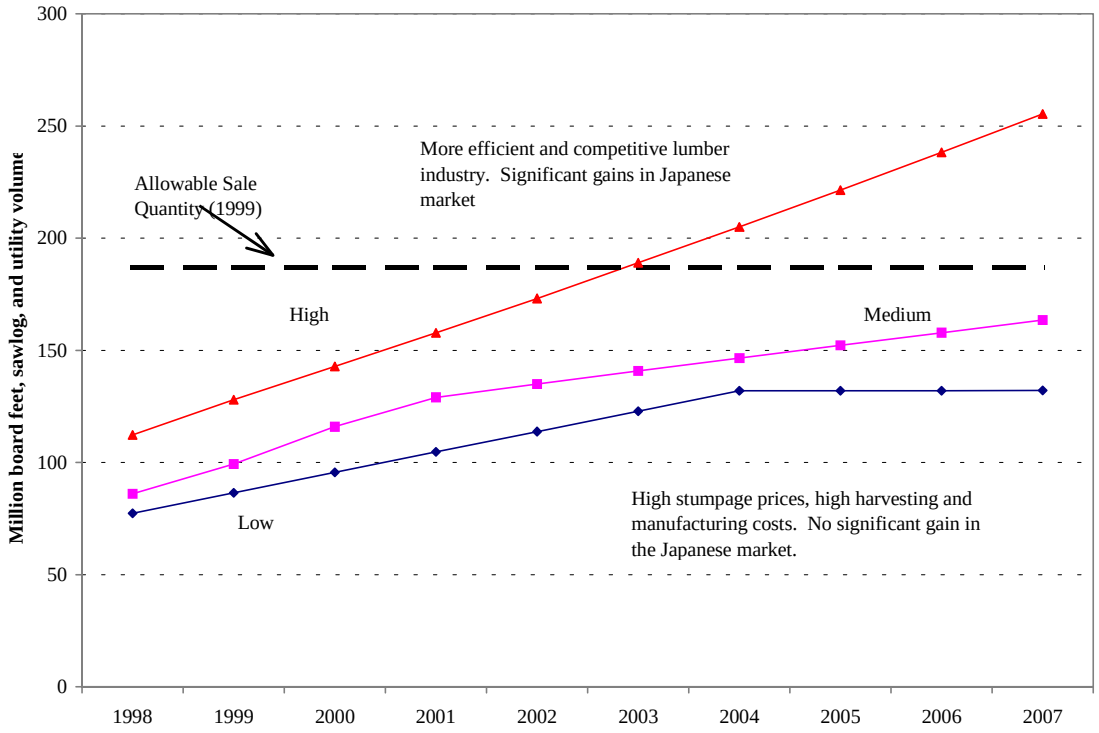



**Figure 3.** Timber harvest volumes for the Tongass under various demand scenarios (Source: Morse 1998).

While these projections are only estimates based on different assumptions, they provide a perspective for evaluating future conditions. For example, if the market for wood products increases rapidly, it stands to reason that larger facilities might be developed to capitalize on the increased demand. However, with allowable sale quantities setting a maximum limit to the supply, the industries overall scale will be limited by the ASQ, and to gains in efficiency and lumber recovery. Within the time frame of the projections, only the high demand scenario for Tongass timber exceeds the ASQ. The low and medium demand trends indicate that the ASQ will not act as a supply constraint to the industry as cost competitiveness is insufficient to use the available resources.

It is important to note that to a high degree demand for Alaska timber is dependent upon supply constraints in other supply regions. The reduced harvests in Washington, Oregon, and neighboring states have impacted the demand for Alaska timber. For investment purposes, these projections can be influential to decision making. One conclusion is that the ASQ will, in effect, cap investment levels regardless of higher demand and product price. The limit will ensure that once demand reaches the ASQ, there will be increased competition for the available supply. This may keep investments low because of the risk of poor returns on investment and contribute to the eventual lack of growth within the industry

The ASQ may also stimulate some investment. To achieve anything approximating an economy of scale, firms will have to make efforts to get as large a share of the ASQ as possible. If the ASQ is reached and excess sawmill capacity still exists, increased competitiveness in the sawmill industry will primarily be achieved by attrition of less efficient facilities.

**Characterization of Alaska's Mills**

The sawmill industry has experienced substantial change related to a variety of supply, infrastructure, and efficiency factors. Concurrent with reduced federal timber supply, sawmill production capacity declined from 370 million board feet in 1990 to 220 million board feet in 1997 (Figure 4). During this period, only 52% of installed capacity was employed. Since 1993, the total sawmill production capacity has exceeded the federal timber supply. This is the result of new mills with large production capacities and modern processing equipment being opened at the same

time as timber harvests were declining in the Tongass. It can be expected that, in the future, sawmill production capacity will decline further as older, less efficient sawmills are shut down due to continued timber supply restrictions.

Alaska sawmill demographics and productivity information was compiled by Hill (1998) for the Alaska DCED through a survey of sawmills in 1995. Of 112 sawmills surveyed, 46 returned completed surveys, providing a 41.1% response rate. The results of the survey suggest that the sawmill industry is dominated by small firms with low production volumes, and limited processing capability. Of the mills responding to the survey, 50% employed less than 4 people, 90% employed fewer than 25 people, and only two required more than 40 people to operate at full capacity. Many of the smaller mills may be part time or seasonal operations that do not operate when market demand is low. Survey results indicate that 86% of Alaska's lumber production and 100% of the export lumber production occurs in Southeast Alaska. Dimension lumber comprises 69% of the total domestic production, while cants/flitches are 56% of total export production. Statewide, the maximum production capacity of the sawmills surveyed for an eight-hour shift is 593 million board feet Southeast Alaska contains 78% of the state's sawmill capacity with a capacity of 462,000 board feet per eight-hour shift.

Sawmills in competing regions such as the PNW typically produce 100 million board feet of lumber per year and employ 100 or more workers. Alaska's harvest restrictions and expansive geography cannot support mills of this size, and according to a study by Roberston and Brooks (unpublished report), their production costs are higher than in other regions. Thus, to be competitive on such a small scale, Alaska mills must be customized to serve niche markets. Alaska processors will need to make investments in their wood processing facilities in order to increase their competitiveness. In Alaska, the most common headrig is a circular saw, followed by bandsaw headrigs (Hill 1998). The often remote location of sawmills influences the style of headrig used. While less efficient, circular saws are often preferred in these locations because they require less technical support and they are easier to repair and maintain. However, the use of circular saws substantially reduces lumber recovery and increases production costs. The changing timber resource in Alaska will almost certainly require sawmills to re-tool to process smaller diameter second growth logs. Installing more efficient processing equipment could also allow sawmills to upgrade their operations and manufacture competitive products targeted at niche markets.

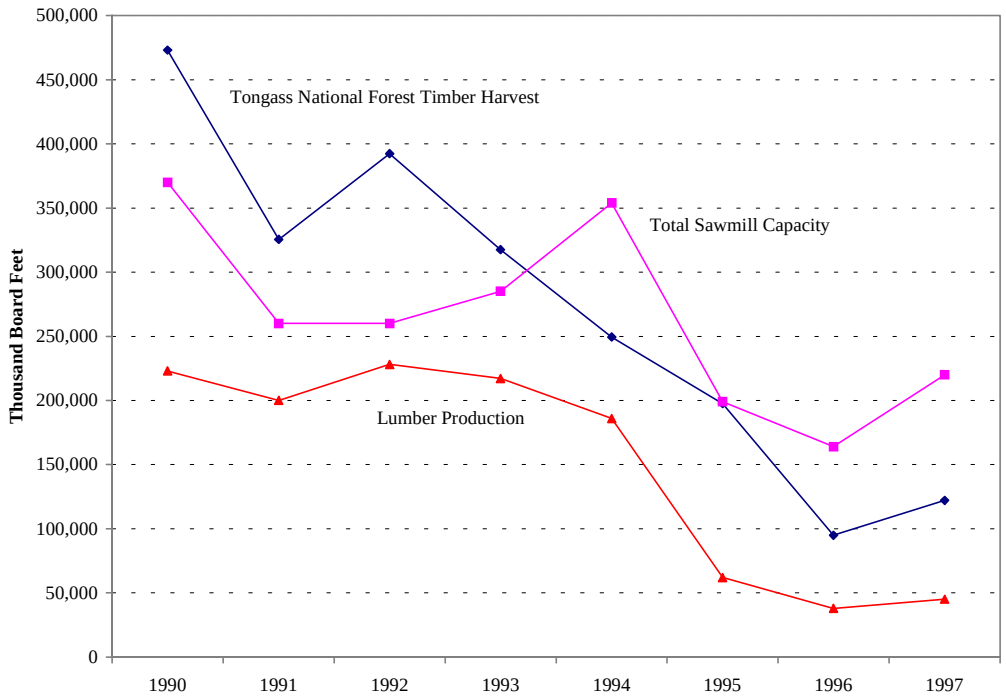



**Figure 4.** Sawmill production capacity, lumber production and the Tongass timber supply for Southeast Alaska (Source: Morse, 1998).

The lack of kiln drying facilities also precludes Alaska from many segments of the export and domestic markets. Of the sawmills surveyed, 16 reported some capacity for air-drying their lumber, three had dehumidification kilns, and only two operated dry kilns. While several sawmills in Southeast Alaska have indicated plans to improve or install dry-kiln capacity, dry kilns and storage sheds will be necessary to remain competitive in the export market, particularly in Japan.

**Labor, Harvesting, and Manufacturing Costs in the Timber Sector**

To assess Alaska's competitive position as a timber supplier, the costs associated with timber harvest and processing are compared to BC and the PNW (Washington and Oregon). Costs associated with the extraction of timber are largely allocated to stumpage, labor, fuel, and transportation while other factors, such as the cost of road building, capital, and technology, have been excluded from the assessment.

*Labor Costs*

Labor costs in Alaska can be higher than labor costs in the PNW, depending on occupation, which adds to the final product price. For example, as shown in Table 3, wood machinists in Washington earn $5.35 per hour less than wood machinists in Alaska. Saw machine operators in Alaska also earn 89 cents per hour more than machine operators in Washington. However, occupations such as logging tractor operators and log handing equipment handlers in Alaska pay less than in Washington. As shown in Table 3, logging tractor operators and logging equipment operators in Alaska earn 80 cents and $1.04 less, respectively, than workers in the same occupations in Washington. While Alaska wages are lower in some occupations, these wage differentials can still hinder the growth of some sectors of Alaska's forest products industry. Wage rates for loggers are somewhat comparable between Washington and Alaska for loggers, which alone (not including transportation costs) should theoretically help lower the cost of primary wood products from Alaska. However, the pay for occupations related to secondary processing activities such as machinists and sawing machine operators are higher, which could raise the cost of secondary processed, or value-added wood products produced in Alaska. Again, the cost of transporting wood products within and out of Alaska could negate any wage advantages that Alaska may have.

*Harvesting Costs*

On a comparative basis, the harvesting costs for Alaska, the PNW, and BC show that BC is the high cost producer of logs (Figure 5). Notably, BC has shown an increasing trend in harvest costs, while the PNW and Southeast Alaska have remained fairly stable despite some variability over the short-term. These trends are likely caused by the influenced of declining acreage, harvest volume, and labor intensity, on harvest costs. It should be noted however, that these harvest cost estimates exclude road building costs, which would inflate the overall logging costs in Southeast Alaska. A large volume of timber in the PNW is harvested from plantations, substantially reducing the cost of road construction, while timber from many public forests is located near established roads. The limited road infrastructure in Alaska necessitates construction of roads in needed to access the timber resource and, as a result, logging costs in Alaska may be higher than costs in BC.

**Table 3.** Labor costs in the logging and sawmill sectors in Alaska and the PNW 1998.

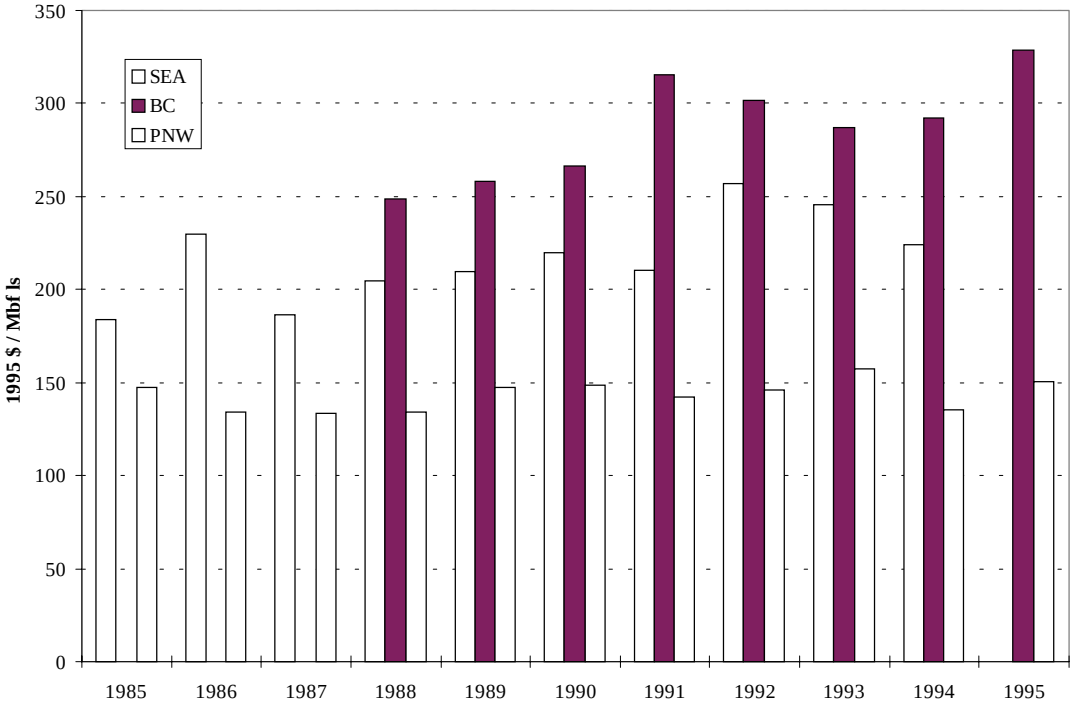
| Occupation Code | Occupation | Average Washington Wage/hr. | Average Alaska Wage/hr |
|---|---|---|---|
| 73011 | Logging Tractor Ops. | $16.41 | $15.61 |
| 73008 | Log Handling Equipment Ops. | $17.85 | $16.81 |
| 89308 | Wood Machinists | $10.57 | $15.92 |
| 92308 | Sawing Machine Ops. | $12.23 | $13.12 |

Source*:* Alaska Department of Labor and Workforce Development, 1998 and Washington State Employment Security Department, 1999.

*Manufacturing Costs*

According to research by Roberston and Brooks (unpublished report), Southeast Alaska has the highest manufacturing costs per thousand board feet of lumber produced (Figure 6). The large discrepancy between Alaska and the other regions can be partially attributed to smaller economies of scale. There are larger sawmills with more efficient processing technology and large market presence in BC and the PNW. The declining costs in BC and the PNW are the result of increased gains through production efficiency, capital investments in processing technology and infrastructure. Rising costs in Alaska are largely attributed to the pulp mill closures where the low quality logs that previously fed the pulp mills have been re-directed to the sawmills. These smaller diameter, lower quality logs result in lower yields, higher handling costs, and an overall decline in production efficiency.

Lower acreage can eliminate the advantage of economies of scale in harvesting operations and lower volumes per acre reduce efficiency of logging efforts (Robertson and Brooks *unpublished report*). These factors are indicative of marginal or second growth stands being harvested and reflects the dwindling availability of prime stands in Alaska. There is no evidence that this trend will reverse. The PNW has large holdings of privately owned second growth timber that can be more easily accessed with more uniform characteristics that keep logging costs relatively stable. High prices in Pacific Rim markets resulting from declining harvests in the PNW after 1990 temporarily reduced the impact of high log costs in Alaska. The Asian recession resulted in an overall market decline in 1997-1998, making cost competitiveness much more critical.




Source: R10 Sale Appraisals, RISI Note: All estimates exclude permanent roading costs

**Figure 5.** Harvest costs in Southeast Alaska, British Columbia, and the Pacific Northwest, 1985-1995 (Source: Robertson and Brooks unpublished report).

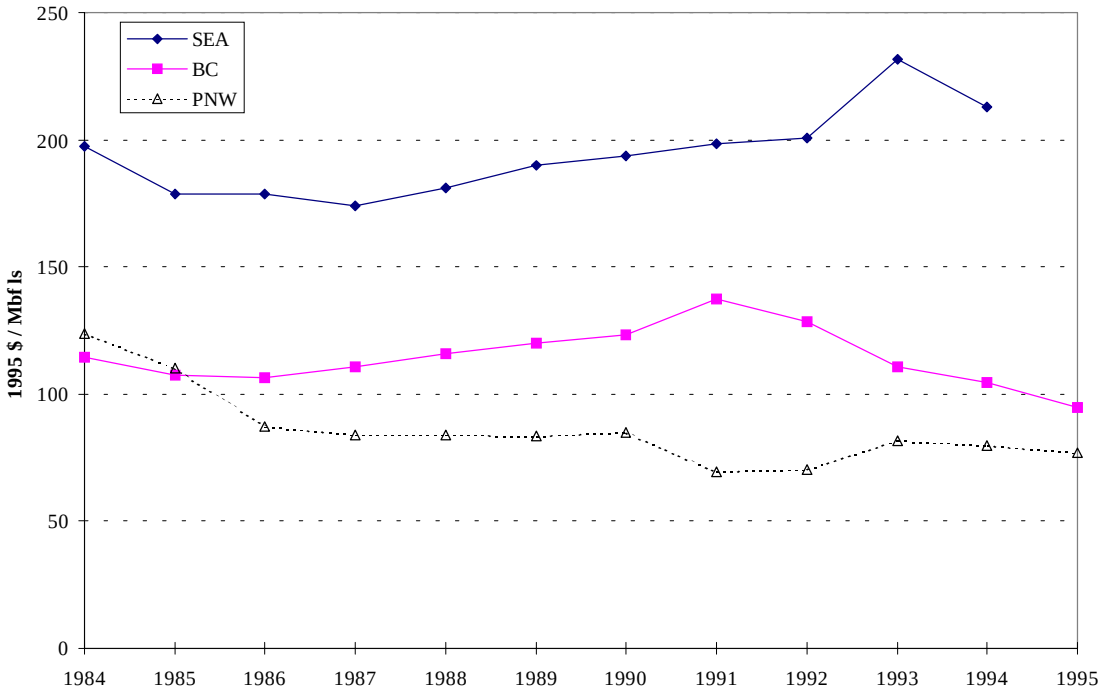



**Figure 6.** Manufacturing costs in Southeast Alaska, British Columbia, and the PNW, 1985-1995.
(Source: Robertson and Brooks unpublished report).

*Total Costs*

On a total cost basis, Southeast Alaska emerges as the high cost producer and the PNW as the low cost producer of softwood lumber (Figure 7). British Columbia's resource base has fairly similar physical and resource characteristics to Alaska and costs in both BC and Southeast Alaska are increasing at a rate of 2% per year, while costs in the PNW are falling at a rate of 2% per year. Between 1985 and 1995, it cost an average of $370 to produce one thousand board feet of softwood lumber in Alaska while in the PNW the average production cost was just $170 per thousand board feet. The production cost in British Columbia was closer to Alaska, averaging $345 per thousand board feet. Since the Alaska share of lumber is heavy to cants, which theoretically should reduce production costs, these averages likely understate the true disparity in total costs between the three regions.

Figure 8 provides a snapshot of the cost structure of sawmills in the three regions in 1994. This analysis highlights the competitive advantage in harvesting and manufacturing that exists in the PNW. While BC has higher harvesting costs than Southeast Alaska, Figure 8 clearly displays their lower processing cost. Stumpage prices in 1994 in the PNW and BC were 58% and 14% of total lumber production costs, respectively, while Southeast Alaska's stumpage prices were just 9% of their total production costs. While Southeast Alaska does have the lowest stumpage prices, this advantage is outweighed by their high harvesting and processing costs which result in Alaska being the high cost lumber producer.

Stumpage prices are generally residual values. In other words, the amount one can afford to pay for logs after subtracting processing and harvesting costs. Even with low stumpage prices, Alaska appears to be the high cost producer, although some of this difference may reflect higher average quality. Since lumber production costs are so high in Alaska and stumpage is so low, there is not much opportunity to aggressively manage the forest for higher growth. Under the current situation, the returns to forest management are too low for all but minimal regeneration efforts.

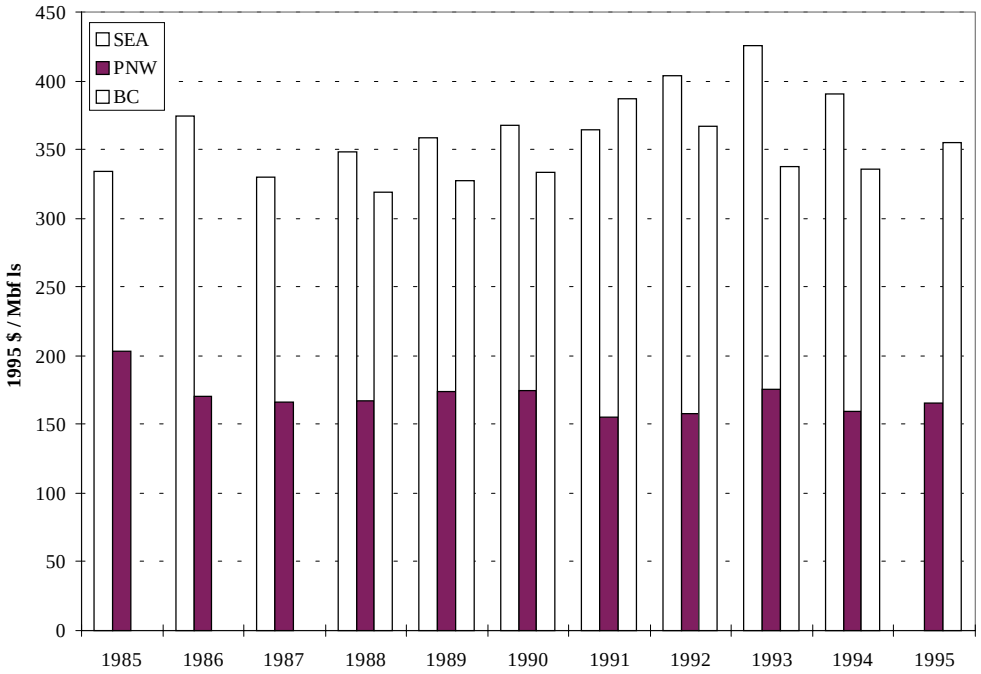



**Figure 7.** Total lumber production costs (labor and production) in Southeast Alaska, British Columbia, and the Pacific Northwest, 1985-1995 (Source: Robertson and Brooks unpublished report).

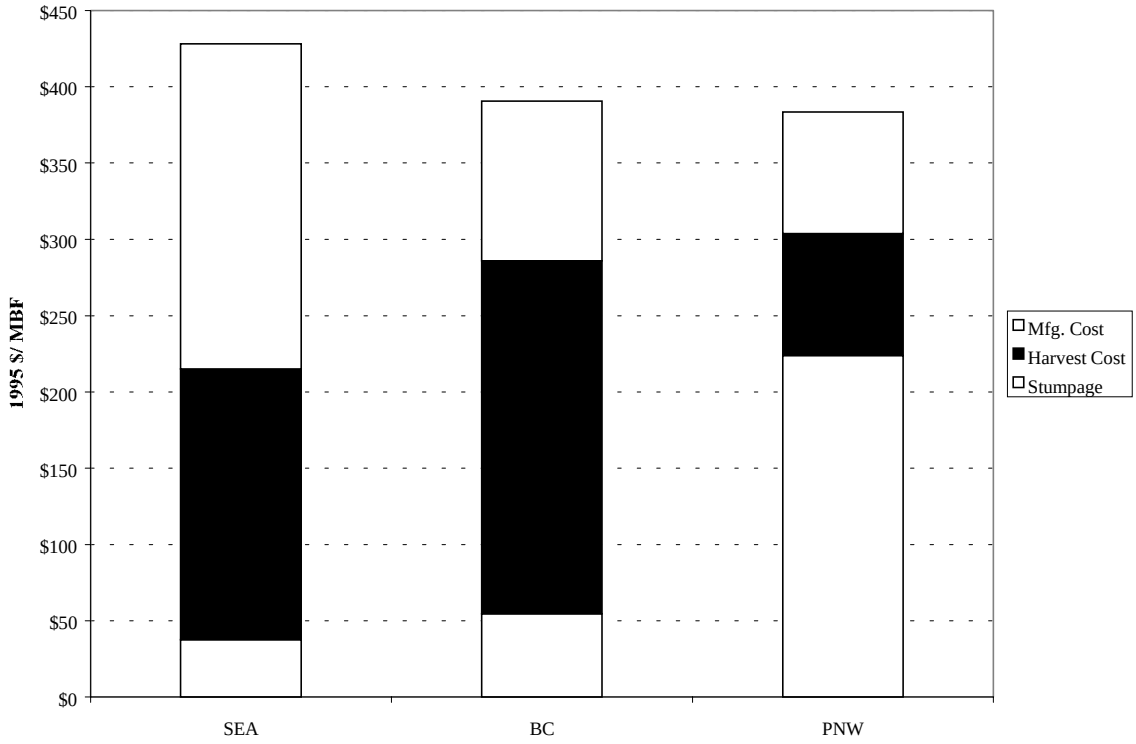



**Figure 8.** Total costs of lumber production (with stumpage) in Southeast Alaska, British Columbia, and the Pacific Northwest, 1994 (Source: Robertson and Brooks unpublished report).

**Transportation**

Alaska's remoteness from its major markets increases transportation costs and reduces the competitiveness of lumber manufacturers. Wood products are commonly shipped by barge to Washington, and the limited availability of barges can further increase costs. One Alaska sawmill estimates that shipping adds $45 to the cost of producing one thousand board feet of lumber since lumber exported to Japan must be shipped through Seattle. Most US carriers of wood products shipped from Southeast Alaska first bring their cargo to Seattle, before reloading the shipment onto new carriers, even if the final destination is another port in Alaska or Asia. The exception to this is large corporations such as Sealaska who charter their own barges and ship logs directly to Asia.

Transportation within Alaska is also restricted by distance, poor road infrastructure, lack of roads, seasonality, and physical geography. These factors limit the movement of timber from the forest to mills, from mills to ports, and of finished goods to other regions of the state and to export markets, and contribute to added costs to the final product.

The type of product being transported can also impact the types of transportation vessels used. Logs are commonly loaded onto barges where they can be left exposed to the elements. Processed wood products, such as lumber and veneer, which require protection from the elements, are generally loaded into containers which further increases the cost and time of transporting these products from Southeast Alaska.

**Energy Costs**

Energy costs vary dramatically throughout Alaska, regardless of the method of generation. Southeast Alaska utilities averaged 9.8 cents/kWh for commercial/industrial customers in 1995, while Washington utilities averaged 3.25 cents/kwh in 1995 (Washington Energy Policy Group 1999). However, one sawmill, generating electricity from diesel generators, reported that their cost of energy was 37 cents/kWh (Alaska Electric Power Statistics 1996). Officials in the Alaska Division of Energy cite the possible installation of hydroelectric dams in Southeast Alaska as one strategy to help reduce energy costs. Some hydroelectric dams have a surplus of energy but whether that energy will be made available to industrial users at competitive prices remains to be seen. Efforts to procure special sale arrangements with the power companies may be worth pursuing. However, the importance of salmon to the region and the potential threats to salmon habitat that are related to dams should be thoroughly considered before implementing any hydroelectric projects. However it is accomplished, in order to develop competitive dry kiln industry in Alaska, firms will need access to energy at rates that are comparable to those of their competitors in other regions.

**Alaska Forest Product Exports**

Softwood logs comprise the bulk of Alaska's forest product exports, followed by softwood lumber and chips (Figure 9). Revenues from log exports remained relatively steady during 1989-1997 with the exception of a spike in revenue in 1993, largely the result of the strong Japanese housing market and harvest constraints in the PNW. Weak demand as a result of the Asian economic crisis caused Alaska exports of wood products to plummet in 1998.

Export data in Figure 10 show that while log export revenues declined after 1993, export volume remained fairly constant, signaling a decline in the price of Alaska logs. With the log shortage created by reduced harvests in the PNW and Alaska, Japan has begun using radiata pine as a substitute in low-grade applications and European whitewoods in high-grade applications. The gap between log export revenue and volume from Alaska has narrowed since late 1993, an indication that Alaska suppliers are deriving less value from the logs they sell in the international timber market. Since the downturn in the Japanese market, the Japanese are increasingly substituting domestic logs and lumber for imported logs and they have become much more price sensitive.

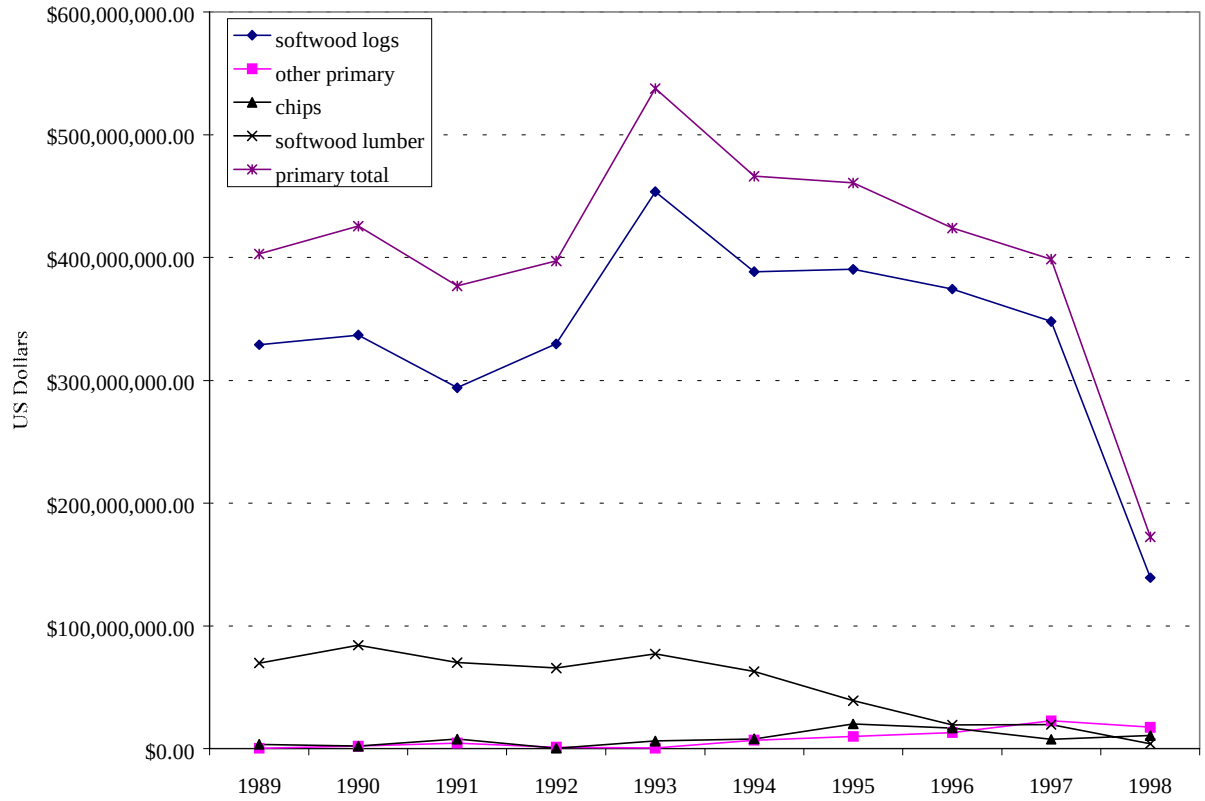



**Figure 9.** Leading primary processed wood products from Alaska to all destinations, 1989-1998*
(Source: U.S. Department of Commerce 1999).
*Commerce data may include some products that "pass through" Alaska ports and do not originate in the state.

Chips, produced from lower grade logs, have been an important source of export revenue for Alaska, although revenue from chip exports have been very erratic during the past ten years. Chip exports increased from 1989 to 1995, before dropping from over $20 million in 1995 to less than $11 million in 1998. Historically, Alaska's pulp mills provided an outlet for chip sales. Since the pulp mill closures, the volume of low-grade logs harvested have increased without a domestic market.

Softwood lumber has traditionally been an important component of Alaska's export mix. Export revenue from lumber, however, has experienced a dramatic decline during recent years as well. Since 1989, lumber exports have declined from a high of over $84 million in 1990, to just over $4 million in 1998. While some of the decline in lumber exports can be attributed to changes in demand in Japan, increased competition from the PNW and BC has also contributed to the decline as well as harvest restrictions on USFS lands.

As revenue from primary wood products has been declining, export revenue from secondary wood products has been increasing. Even during 1997-1998, a period when value-added wood exports from the US declined an average of 40% due to the Asian economic crisis, Alaska exports of secondary processed wood products increased slightly (Figure 11). The leading secondary wood product exports from Alaska include wood or wood frame seats, pallets and packing cases, wooden furniture, and wooden doors and frames. Note however, that exports of secondary manufactured products generate a fraction of the revenue derived from primary wood products. In 1998, Alaska exported $172 million in primary products and just $2.7 million in secondary processed products.

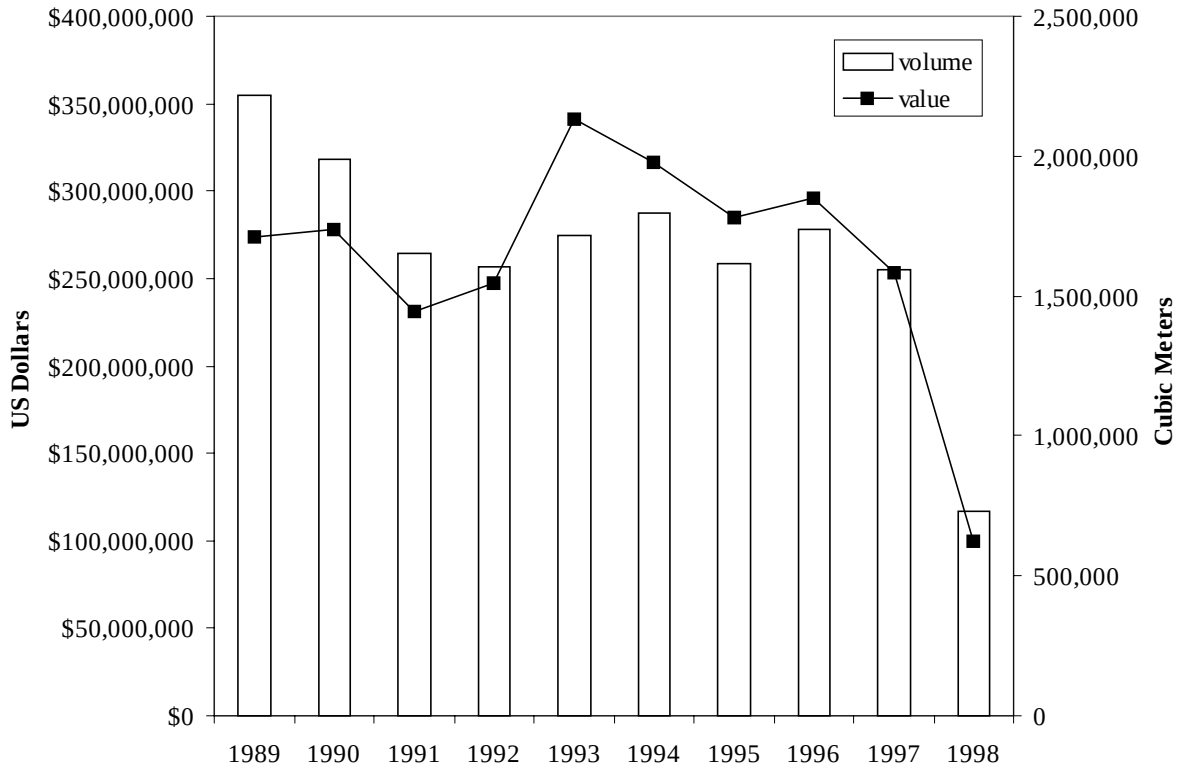



**Figure 10.** Softwood log export volume and revenue exports from Alaska, 1986-1998
(Source: U.S. Department of Commerce 1999).

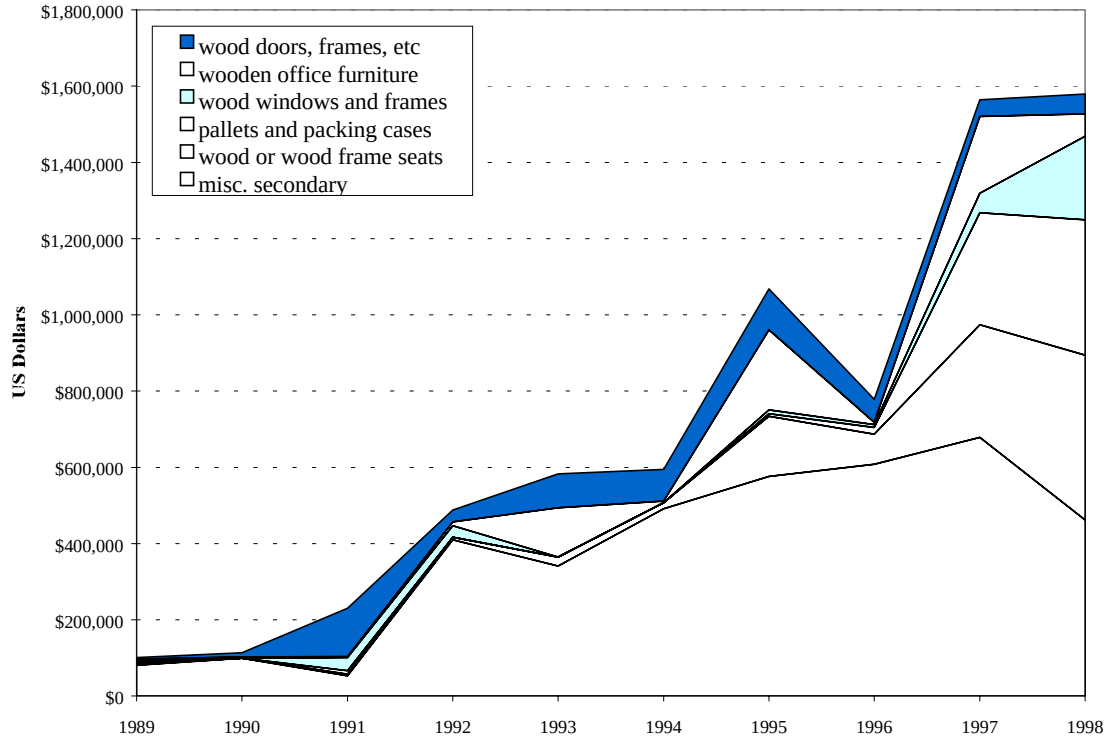



**Figure 11.** Leading secondary processed wood product exports from Alaska to all destinations, 1989-1998
(Source: U.S. Department of Commerce 1999).